## REMARKS

### I. Introduction

Claims 8 to 21 are pending in the present application. In view of the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

### II. Information Disclosure Statement

Regarding the Information Disclosure Statement, the Examiner will note that submitted herewith is a Supplemental Information Disclosure Statement citing copies of the foreign patent document that were indicated to have not been received and providing a copy of the English language abstract thereof.

### III. Rejection of Claims 8 to 21 Under 35 U.S.C. § 103(a)

Claims 8 to 21 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of DE 198 38 466 ("Lenfers et al.") and U.S. Patent No. 3,949,551 ("Eichler et al."). It is respectfully submitted that the combination of Lenfers et al. and Eichler et al. do not render unpatentable the present claims for at least the following reasons.

To reject a claim under 35 U.S.C. § 103(a), the Office bears the initial burden of presenting a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish *prima facie* obviousness, three criteria must be satisfied.

First, there must be some suggestion or motivation to modify or combine reference teachings. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). As clearly indicated by the Supreme Court, it is "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. *See KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007). In this regard, the Supreme Court further noted that "rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Id.*, at 1396. Second, there must be a reasonable expectation of

success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim features. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). As explained herein, the Final Office Action does satisfy these requirements of § 103 as to all of the features of the claims.

Claim 1 relates to a method for operating a broadband lambda sensor for determining an oxygen concentration in the exhaust gas of an internal combustion engine operated with a fuel-air mixture, and recites, *inter alia*, that the method includes, repeatedly reversing the polarity of the pump voltage during at least the lean operation to create a temporary reversal of direction of the pump current, wherein the repeated reversal of polarity of the pump voltage is carried out at least one of during the duration of a secondary fuel injection in the lean operation of the internal combustion engine and during a warm-up phase of the lambda sensor.

The combination of Lenfers et al. and Eichler et al. does not disclose or suggest these features. Lenfers et al. relate to a method for operating a broadband lambda sensor (10), which after a long period of lean operation of the lambda sensor (10), a switching device (54) causes a pulse-like reversal of pump current, which breaks down a polarization effect at the lambda sensor (10), thus, preventing any inaccuracy in the measurement value. Lenfers et al. state, in column 3, lines 53 to 55, that "it is assumed that the fuel-air mixture with which the internal combustion engine is operated is in a lean range for a ***long period of time***" and in column 4, lines 54 to 56, that "on the whole, the rich drift during ***long-term lean operation*** is eliminated by brief, defined rich operation of sensor 10." (emphasis added). Further, the Final Office Action admits that "Lenfers et al fails to teach the engine to be in lean condition during the warm-up phase or during the duration of a secondary fuel injection." (Office Action, p. 4). Thus, nowhere do Lenfers et al. address repeated reversal of polarity of the pump voltage at least one of during the duration of a secondary fuel injection in the lean operation of the internal combustion engine and during a warm-up phase of the lambda sensor, both of which can occur in relatively ***short*** periods of lean operation.

Eichler et al. purport to relate to a method and system to reduce the noxious components in the exhaust gases during the warm-up period of the internal combustion engine. Nowhere do Eichler et al. address a secondary fuel injection in

the lean operation of the internal combustion engine. Further, Eichler et al. merely indicates that a warm-up phase occurs during a lean operation, but does not suggest repeated reversal of polarity of the pump voltage during a warm-up phase of the lambda sensor. Thus, the combination of Lenfers et al. and Eichler et al. does not disclose or suggest carrying out repeated reversal of polarity of the pump voltage at least one of during the duration of a secondary fuel injection in the lean operation of the internal combustion engine and during a warm-up phase of the lambda sensor.

Furthermore, the Final Office Action contends that "Eichler et al teaches in figure 2 and in column 2, lines 13-16 for the engine and in turn the sensor to be in the lean phase during warm up." (Office Action, p. 4). In this regard, the Final Office Action contends that "it would have been obvious to one possessing ordinary skill in the art at the time the invention was being made to also utilize these pulses during other extended periods of lean operation, such as the during an initial warm-up lean operation like shown by Eichler, so as to prevent the polarization of the electrodes during these other lean operations as well." (Office Action, p. 5). However, Lenfers et al. refer to reversals which occur during ***long-term lean operation***, while Eichler et al. refer to ***short-term lean operations***, as in, for example, the warm-up phase. Therefore, the modification as proposed by the Final Office Action, to use Lenfers et al. in combination with Eichler et al. to break down a polarization effect at the lambda sensor through reversal of polarity during short-term lean operation, would have been unpredictable based on the disclosures of the relied upon references. While Lenfers et al. in combination with Eichler et al. may result in preventing inaccuracies in the measurement value during long term lean operation, there is no indication that inaccuracies in the measurement value due to polarization effect at the lambda sensor during short term lean operation could be prevented. Thus, the suggested modification necessarily relies on improper hindsight reasoning based on Applicants' disclosure.

In the "Response to Arguments" section, the Office Action asserts that that "there is no indication that it would be beneficial to not apply the polarity reversals in any condition of lean operation because at any point the rich drift can begin to take effect and skew the concentration readings." While there may be *no* indication to *not* apply polarity reversal to short term lean operation, there is also no indication *to* apply polarity reversal to short term lean operation. Carrying out ***repeated*** reversal of polarity of the pump voltage, in ***short*** term lean operation, has

not been contemplated by the prior art, so that any such suggestion by the present Office Action is necessarily based on improper hindsight reasoning based on Applicants' disclosure.

Moreover, the Final Office Action has ***not provided any support for the proposition that there was a reasonable expectation of success*** for modifying the features of Lenfers et al. to apply repeated reversals of polarity to short term lean operation. For example, the present application discloses that the reversal of polarity that is repeatedly carried out "ensures that due to the repeated short-term anodic loading of the inner electrode of the pump cell, oxygen ions are pumped into the measurement chamber, where they oxidize the hydrocarbons. If the repetition rate of the reversal of polarity of the pump voltage is selected to be high enough, the dynamic characteristic of the sensor is not altered. At a sufficiently high electrode temperature, the oxygen transport can effectively follow the pump frequency, and the catalysis of the hydrocarbon conversion is improved." (Page 3, lines 10 to 20). The cited art does not contemplate the application of repeated reversal of polarity of the pump voltage to short term lean operation.

For all of the foregoing reasons, the combination of Lenfers et al. and Eichler et al. does not disclose or suggest all of the features of claim 8. As for claims 9 to 21, which ultimately depend from claim 8 and therefore include all of the features included in claim 8, it is respectfully submitted that the combination of Lenfers et al. and Eichler et al. does not render unpatentable these dependent claims for at least the reasons more fully set forth above in support of the patentability of claim 8.

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

## IV. Conclusion

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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